

GBPPR 'Zine



Issue #110 / The Monthly Journal of the American Hacker / June 2013

"Let's celebrate diversity by having the next dean NOT be Jewish."

— Quote from Anya Bargh, 32, a student at the University of Connecticut School of Law. She was arrested in April because of emails she allegedly sent in February to the Student Bar Association regarding the search for the new law dean.

I can assure you, all those hook-nosed lawyers who scream about "freedom of speech" (or diversity) will *NOT* be coming to her aid!

(abovethelaw.com/2013/04/law-student-arrested-for-anti-semitic-racist-threatening-comments)
(vnnforum.com/showthread.php?t=154541)

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BELL SYSTEM PRACTICES
AT&TCo StandardSECTION 231-037-000
Issue 2, June 1977**CENTREX DATA LOOP AND CONSOLE CONTROL****DESCRIPTION/THEORY****2-WIRE NO. 1 OR NO. 1A ELECTRONIC SWITCHING SYSTEM**

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FIGURES		1.01 This section describes the centrex data loop, the console control system, and the remote interface system used in conjunction with the 2-wire No. 1 or 1A Electronic Switching System (ESS) equipped to provide centrex-CO and PBX-CO service. For a general description of centrex-CO and PBX-CO service designed for the 2-wire No. 1 and 1A ESS, reference should be made to Section 966-102-100.	
1. Basic 2-Wire No. 1 or No. 1A ESS Centrex System	4	<i>Note:</i> Effective with what would have been CTX-8, Issue 4, of No. 1 ESS, the equivalent generic program designation is 1E4. The corresponding generic designation for No. 1A ESS is 1AE4.	
2. ESS Centrex Data Link Frame	5	1.02 This section is reissued to include information concerning the remote data interface system and to make minor corrections. Since this reissue is a general revision, arrows ordinarily used to indicate changes have been omitted.	
3. ESS Centrex Console Control Cabinet	6	1.03 This section includes the following information:	
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(c) With 121-, 131-, and 151-type 50A-CPS attendant consoles that do not require centrex data link hardware.

(d) Without attendant consoles (using call director, keyset, or simple telephone as attendant position).

1.05 This section describes the centrex data loop and console control system operation when providing centrex-CO and PBX-CO service with the 1B-, 2B-, 27A-, and 47A-type consoles or with remote data interface system equipment.

1.06 The operation of the centrex data loop and console control system for centrex-CO and PBX-CO service is basically the same. The primary difference is the modification of centrex-CO translations to simulate PBX-CO service.

Note: For convenience of reference in this document, centrex-CO and PBX-CO customer service is referred to as centrex service.

1.07 This centrex service utilizes the data handling capabilities and switching facilities of a 2-wire No. 1 or 1A ESS central office. All centrex operations are under the control of the central control (CC) or the signal processor (SP) in the ESS office to which the customer group is connected.

1.08 In order to control the lamp states and to receive key signals from the remote centrex attendant consoles, a data loop and a console control system are employed. Figure 1 is a block diagram of a typical centrex customer group. The centrex data loop connects the attendant telephone consoles at the customer premises with the 2-wire No. 1 or 1A ESS central office. This loop is a peripheral unit which provides 2-way data communications between the central office and the attendant consoles. Lamp data is transmitted by means of this loop to the attendant consoles in order to control the states of lamps on the consoles. The console lamps indicate service requests or other supervisory signals to the attendant. Key signals from the attendant consoles are also transmitted to the central office by the data loop. These key signals are interpreted at the ESS central office as requests for specific actions at the central office. Only one console is shown although as many as four may be controlled by a single data loop and console control system.

1.09 In order to provide data for use by a management information system (MIS) or other peripheral equipment (CRT, printer, etc) at the customer premises, a remote data interface system is installed on the customer premises to provide the necessary interface functions.

1.10 The central office end of a centrex data loop terminates in a centrex data link circuit mounted on a centrex data link frame in the ESS central office. The data link is a peripheral unit which provides the interface between the data loop and the ESS central office control equipment.

1.11 The remote end of the data loop terminates in a console control circuit contained in the 51A-CPS centrex console control cabinet or in a remote data interface system at the customer location. The console control circuit provides the interface between the data loop and the attendant consoles. The remote data interface provides the interface between the data loop and a management information system or other peripheral equipment.

1.12 Listed below are the abbreviations used in this section:

ACD	Automatic call distribution
ACMOS	Automatic customer outputting system
BPS	Bits per second
CC	Central Control
CCC	Console control cabinet
CILM	Call indicator lamp memory
CPD	Central pulse distributor
CPS	Customer premises system
CXDX	Centrex data link and console demand exercise
ENST	Enable-start
ESS	Electronic switching system
KSP	Key signal present

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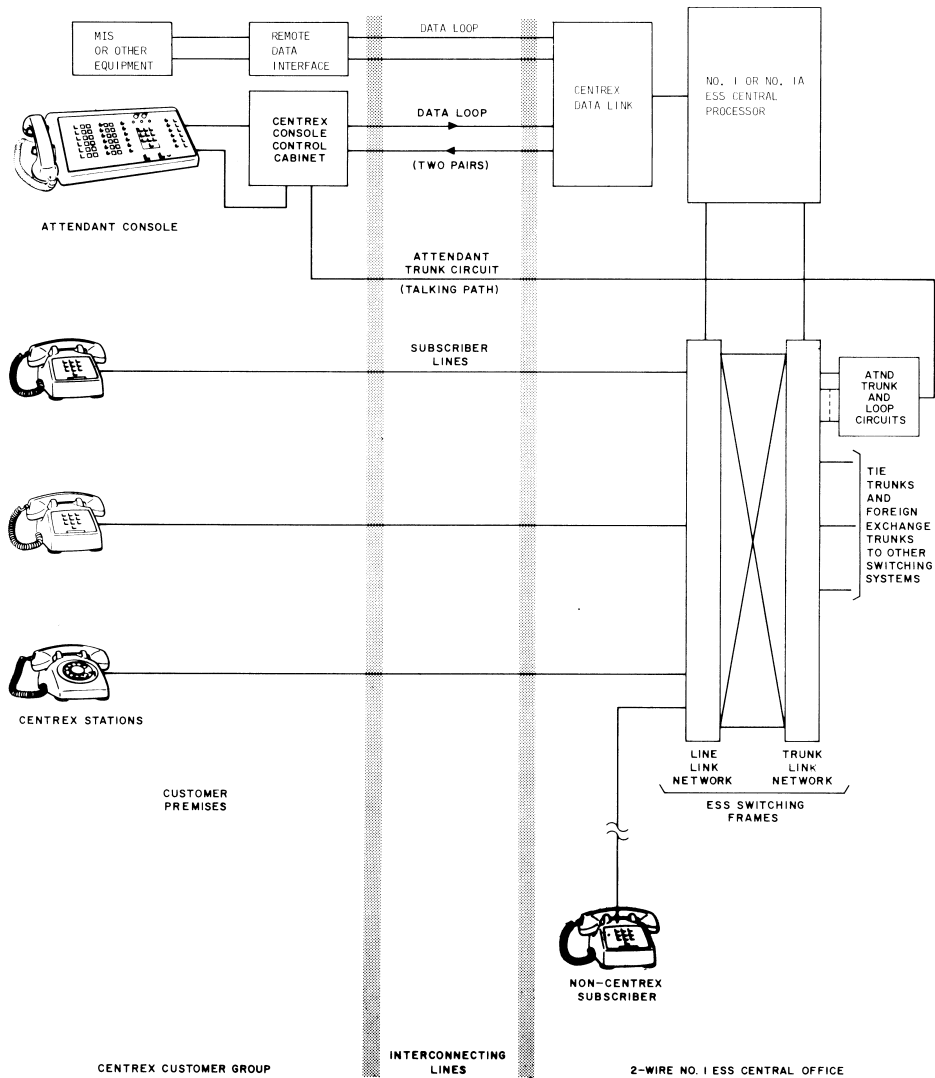


Fig. 1—Basic 2-Wire No. 1 or No. 1A ESS Centrex System

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LMLM	Loop and miscellaneous lamp memory
LSP	Lamp signal present
MIS	Management information system
MS	Mark-space
OTBM	Optional trunk busy memory
RDI	Remote data interface
SP	Signal processor
TBM	Trunk busy memory
TTY	Teletypewriter.

2. CENTREX EQUIPMENT DESCRIPTION

2.01 In addition to attendant consoles and station telephones, two other specialized equipment units are required for centrex operation. These are the centrex data link frame (Fig. 2), located in the ESS central office, and a centrex console control cabinet (Fig. 3), or remote data interface system, located at the customer's premises. The centrex data link frame provides the interface between the ESS central office equipment and the data loop. The centrex console control cabinet (CCC) or remote data interface (RDI) provides the interface between the consoles or other equipment and the data loop.

CENTREX DATA LINK FRAME

2.02 A centrex data link frame (Fig. 2) is a standard 7-foot frame which can house a maximum of eight data links and the associated common equipment. The frame may be partially equipped, but link 0 must always be installed. There is a maximum of four frames per office through generic program CTX-8, Issue 3. Beginning with generic program 1E4 (1AE4), an office may have a maximum of eight data link frames.

2.03 The common equipment includes facilities for reading peripheral bus information and facilities for receiving enable signals from the central pulse distributors (CPDs). The common circuitry also includes the data link address bus and the dynamic buffer registers.

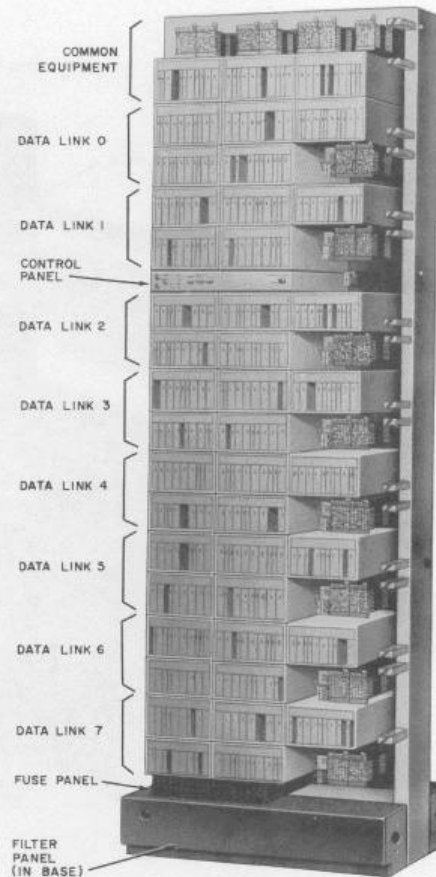


Fig. 2—ESS Centrex Data Link Frame

2.04 Each data link circuit contains a data link controller and a scanner buffer circuit in addition to the data transmitter, receiver, and shift register.

2.05 The data link controller accepts the enable signals from the common equipment and

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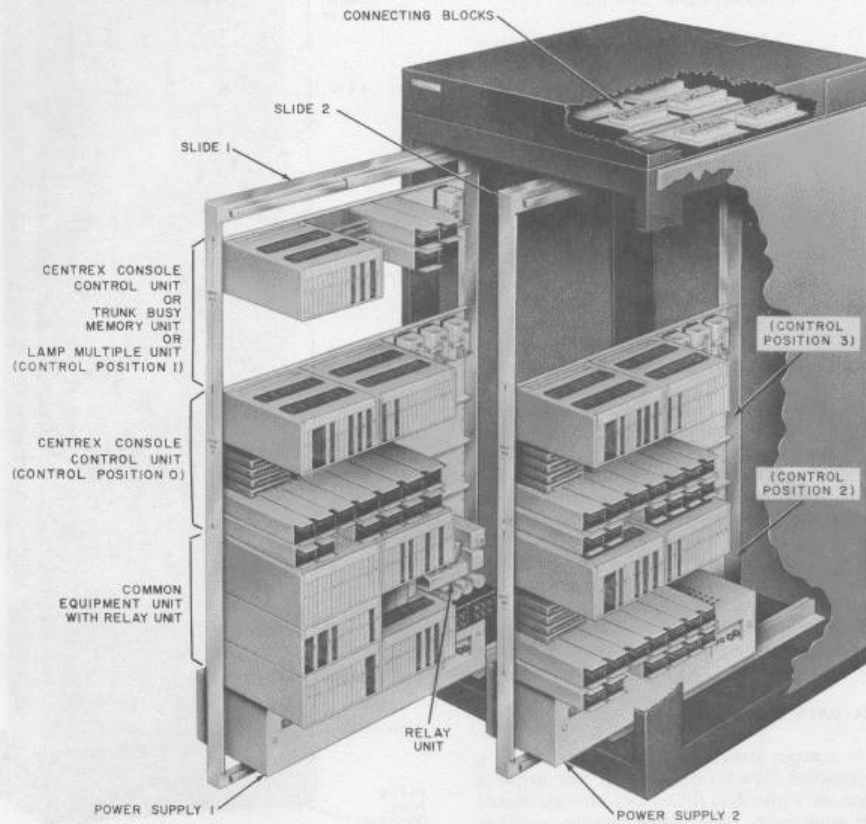


Fig. 3—ESS Centrex Console Control Cabinet

selects the peripheral bus containing the desired data. The controller also provides timing functions and sequencing of events necessary to initiate the reading of the peripheral bus data and to transmit the received data word.

2.06 The scanner buffer circuit contains buffer circuits necessary to supply the current to drive scan points.

2.07 Each data link also contains a bit counter used to determine the end of transmission by counting the number of bits transmitted.

2.08 A centrex data link circuit performs the following functions:

- (a) Accepts and temporarily stores a 24-bit word from either of the two peripheral buses
- (b) Converts this stored word into a sequence of mark and space signals and transmits them to the line in serial form
- (c) Generates the line-signal intelligence by a frequency-shift method of signaling
- (d) Simultaneously transmits and receives data at a rate of 1400 bits per second (BPS) and temporarily stores the received information in the same location (data shift register) that previously contained the transmitted word
- (e) Initiates data transmission when requested by either the central office or the remotely located centrex equipment.

DATA LINK INTERCONNECTIONS

2.09 Each centrex data link frame is equipped with scan points, signal distributor points, duplicated CPD points, and connections to the duplicated peripheral unit bus.

Central Pulse Distributor Points

2.10 Each centrex data link frame is provided with two duplicated CPD points per data link. A CPD point is assigned to gate data into the shift register from each peripheral unit bus. This permits a choice of either bus and either CPD; therefore, four different routes are available to load the shift register. The other CPD point causes the data link to go into the transmit mode.

A special reverse sequence of these points is also used to place the link in a test mode in which the shift register can be shifted one step at a time on command.

Signal Distributor Point

2.11 One signal distributor point is assigned per data link to provide a maintenance function. This point is a part of the data loop transfer circuit (Fig. 4). It is used to switch the data loop from a normal loop to a local loop condition to aid in isolating troubles in the data loop circuitry.

Supervisory Scan Points

2.12 One supervisory scan point is assigned per data link frame as a common fuse alarm. This is a supervisory scan point scanned at a 100-millisecond rate. If a data link or the common equipment on a data link frame should develop a power failure due to a blown fuse, this supervisory scan point is energized, and an indication is displayed on the ESS master control center alarm, display, and control panel.

2.13 The data link frame is also equipped with an alarm retire key which has an associated supervisory scan point.

2.14 A set of scan points (one per data link) is employed to indicate that a valid data loop is present (that is, a 700-cycle tone is present in both directions).

Directed Scan Points

2.15 Two 16-point information scan rows are assigned per data link to provide access to the centrex data unit shift register. These scan points are assigned in adjacent rows. Twenty-six of the scan points are delegated to read the contents of the shift register; four are assigned to indicate the state of the console for maintenance and checking purposes; and two are spares. These scan points are scanned whenever the key signal present (KSP) fast scan point indicates the presence of data. The information row scan point assignment has been arranged so that the data link can grow smoothly from a 1-console to a 4-console installation.

SECTION 231-037-000**Fast Supervisory Scan Points**

2.16 Each centrex data link is equipped with a KSP scan point. This is a supervisory scan point which is saturated when a key signal is received from an attendant console at a remote customer location. Before any lamp data is transmitted from the central office to the remote location, this scan point is examined to determine whether or not there is a key signal or interrogate word stored in the data register. If one is present, lamp data transmission is delayed until the key signal has been read out. Entire scanner rows of 16 scan points are assigned for the exclusive use of the KSP function. Unused scan points in these rows will not be used for other purposes. If there are more than eight data links in a central office, the additional scanner rows need not be on adjacent rows in the scanner.

CENTREX CONSOLE CONTROL CABINET

2.17 Each centrex customer with 1B, 2B-, 27A-, or 47A-type attendant consoles is provided with a centrex console control cabinet (Fig. 3). This cabinet provides the interface between the data loop and the attendant consoles. One console control cabinet is capable of controlling a maximum of four of the small (1B- or 27A-type) attendant telephone consoles. For large (2B- or 47A-type) attendant console installations, the first such cabinet can be equipped to handle three large consoles and one trunk busy memory (TBM) unit. Additional cabinets belonging to the same customer group can be equipped to handle four large consoles.

2.18 A centrex console control cabinet may be shared by different centrex customer groups under the restrictions covered in Section 966-102-100.

2.19 This centrex console control cabinet contains equipment common to all consoles controlled by the cabinet and equipment added on a per console basis.

COMMON EQUIPMENT

Common control equipment

Power supply (one per slide)

Trunk busy memory unit (for 2B- or 47A-type consoles and position no. 1, first cabinet only)

Lamp multiplying circuit (in position no. 1, ninth cabinet only)

ADDED EQUIPMENT PER CONSOLE

Console control unit

2.20 The console control cabinet provides the following functions:

- (a) Encodes attendant console key signals
- (b) Transmits key signals as data to the central office
- (c) Receives lamp data from the central office
- (d) Decodes lamp data received from the central office
- (e) Provides timing
- (f) Furnishes local power
- (g) Provides the lamp interrupter circuitry
- (h) Contains the lamp memories
- (i) Contains a pulser circuit for controlling ferreeds in the lamp memories
- (j) Receives and decodes special non-lamp-order words for interrogate and diagnostic purposes.

REMOTE DATA INTERFACE SYSTEM

2.21 Each centrex customer with an MIS, ACD phase 2, ACMOS, or similar customer premises terminal equipment requires an interface with the ESS and is provided with a remote data interface (RDI) system designed for the specific terminal equipment (Fig. 5). The RDI is available beginning with generic program 1E4 (1AE4).

2.22 The RDI system is composed of a combination of the following types of equipment:

Modulator-demodulator

Interface equipment

Programmable controller

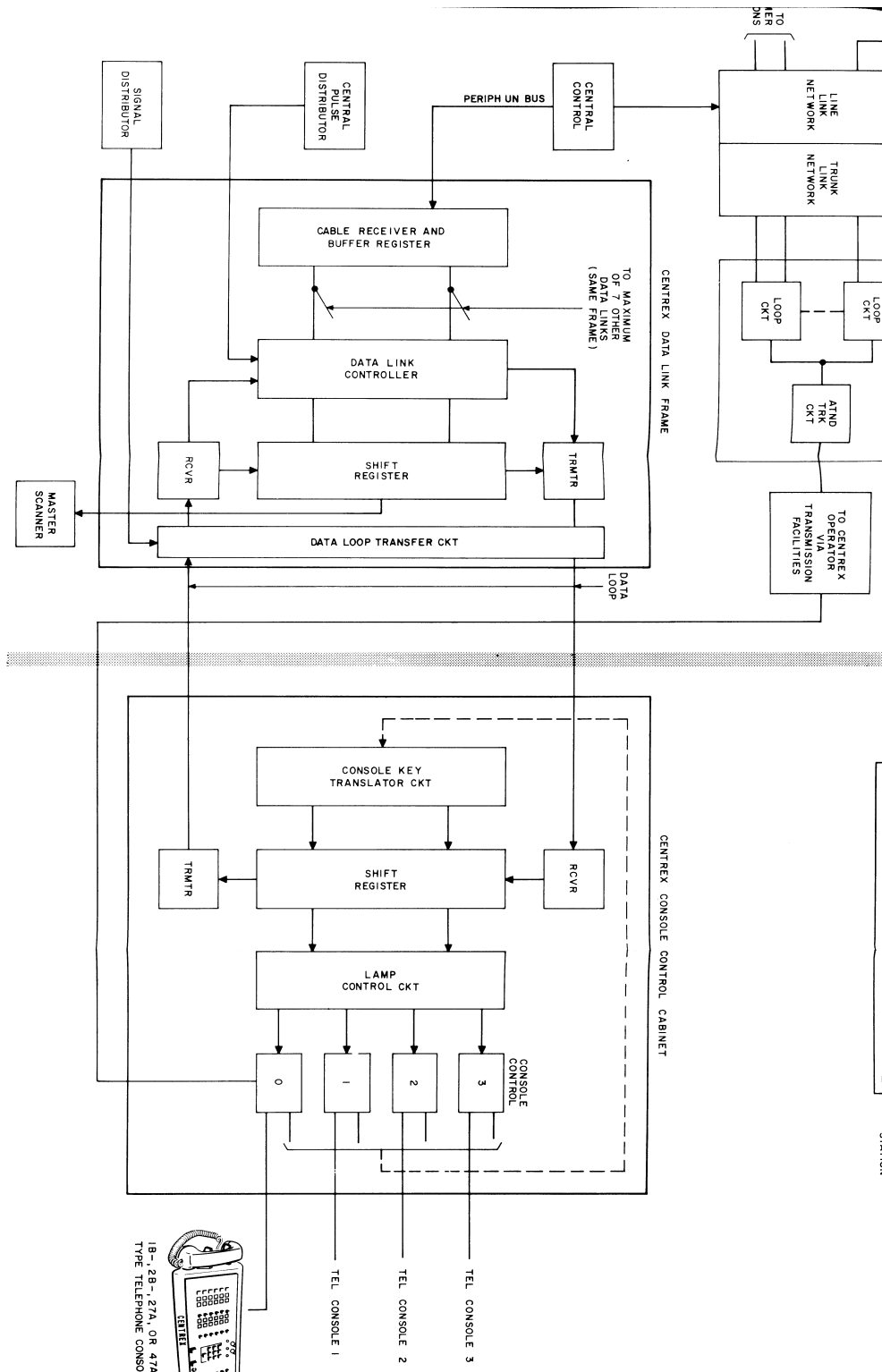
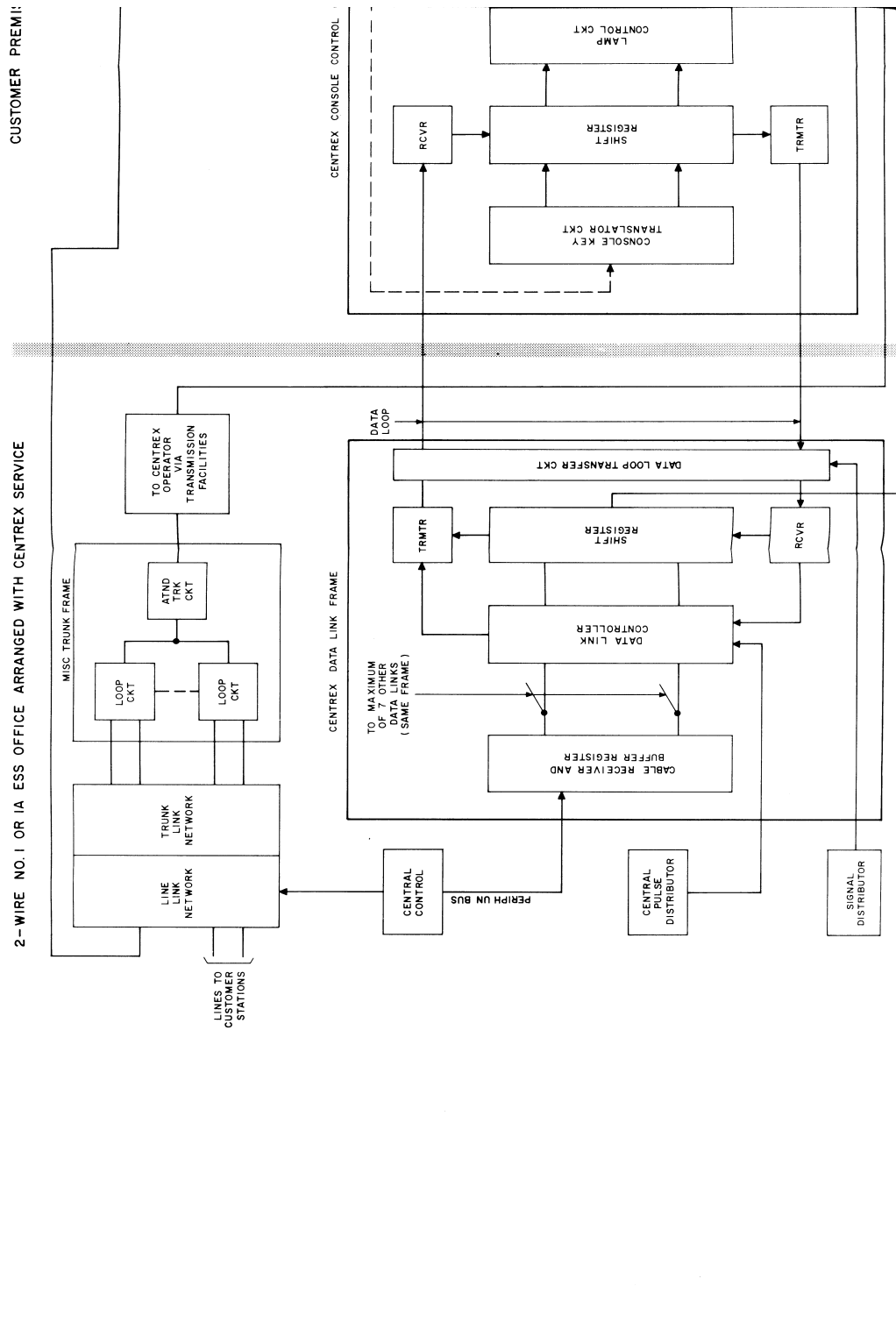


Fig. 4—Centrex-CO or PBX-CO Services Using Const
Control Cabinet—Block Diagram



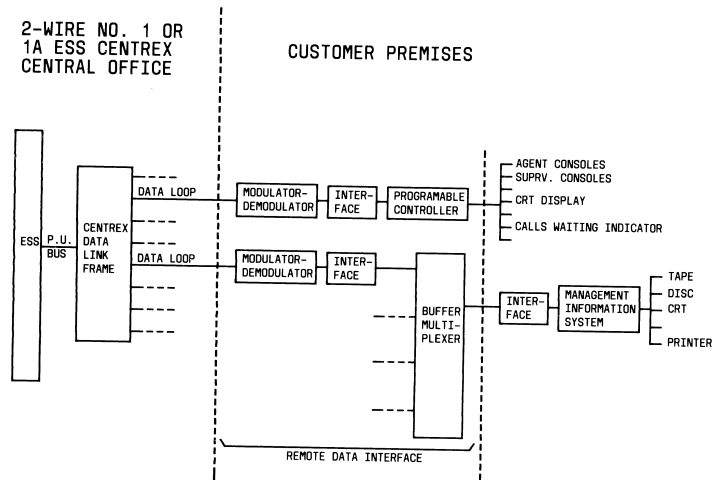


Fig. 5—Centrex Service Using Remote Data Interface System—Block Diagram

Buffer-multiplexer.

3. CENTREX DATA LOOP AND DATA LOOP SIGNAL TRANSMISSION

CENTREX DATA LOOP

3.01 Console lamp state changes and key signals are transmitted as data between the customer location and the central office by means of the data loop. Figure 4, a block diagram of centrex service, illustrates this data loop.

3.02 The centrex data loop consists of two separate 2-wire unidirectional data links. These data links are interconnected at the central office end and at the customer end by means of transmitting and receiving circuitry in such a way that the two links form a complete loop.

3.03 Lamp data used to control the states of the lamps on the consoles is transmitted from the central office to the attendant consoles, and

key signal data is transmitted from the customer location to the central office by means of this data loop. Voice frequencies are used for transmission. A synchronous form of transmission is employed; therefore, the receiving end of a data loop is always in synchronism with the transmitting end.

3.04 Data is transmitted serially in the form of a 26-bit data word which contains 24 information bits plus a leading 1 and a control bit. The leading 1 is used to indicate to the data receiver circuit at the remote end of the data loop that transmission has started.

A. Data Shift Registers

3.05 A 26-bit shift register is located at both the central office end and the customer end of the data loop. These shift registers provide the means for parallel-to-serial and serial-to-parallel

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conversion of the transmitted and the received data.

3.06 The data shift register located at the central office end of a data loop accepts the 24 bits of data from the peripheral unit bus and temporarily stores it before the data is transmitted as lamp data to the remote end of the data loop. In addition, this register is also used to receive and temporarily store key signal data originating from the remote end. The CC (or SP) at the central office can read out the contents of this register via scan points when key signal data is received.

3.07 The data shift register located at the customer end of the data loop accepts and temporarily stores 24 bits of data originating from keys being depressed on the console. (This data is transmitted as key signal data to the central office end of the data loop.) In addition, this register receives and temporarily stores the lamp data which is used for controlling the console lamps transmitted from the central office end.

3.08 Transmission on the data loop is controlled by the circuitry located in the central office. However, a request to transmit the contents of a register may be initiated by either the CC (or the SP) at the central office or by the attendant console circuitry at the customer's premises.

3.09 When a data loop is in an idle state (that is, no data is being transmitted in either direction), spaces (binary 0s) are, in effect, being transmitted continuously in both directions. Upon receiving a request to transmit, the transmitting circuitry at the central office applies the contents of the shift register to the line in serial form. The first pulse transmitted is always a mark (a binary 1). The receipt of an initial mark changes the state of the receiver at the remote end from idle to active and causes the receiving shift register to shift in synchronism with the received line signal.

3.10 When either the CC or the console circuitry requests transmission of a data word, the two registers interchange their contents. Since normally only one of these registers contains any information when a data transmission occurs, a blank word containing all 0s (spaces) is usually transmitted in one direction. If the central office end of the loop requests to transmit, the register at the remote end usually transmits all 0s. If the remote end of the loop requests to transmit, the

register at the central office end of the loop usually transmits all 0s. In some instances, however, both registers will contain information. Data is transmitted at a rate of 1400 BPS in either direction.

B. Lamp Data Transmission

3.11 Service requests and other supervisory signals are sent as lamp data from the ESS central office to the customer location by means of the data loop. Lamp data is sent from the CC (SP) over the peripheral bus to the common control equipment in a centrex data link frame. The common control equipment selects the proper lamp data transmitter, which is enabled by the CPD. From here, the data is loaded into a register and transmitted serially as binary coded signals by means of a data link to a data receiver at the centrex customer location. The lamp control circuit decodes the message and stores it in a lamp state memory unit. The lamp state memory then operates the selected console lamps to the desired state.

C. Key Signal Transmission

3.12 Key signals are generated when an attendant operates a console key. These signals are encoded by an associated key signal translator in the console control cabinet at the customer's premises. The encoded data is inserted into the local shift register as a binary number when the register is found to be empty. From there this data is transmitted in serial form to the ESS central office where it is received by a receiver. The receiver stores the data in the data shift register. The contents of the register are read out by means of the key scan program which is entered from the CC executive control program at regular interrupt intervals.

D. Key Scan Program

3.13 A key scan program scans the centrex data units at the central office for the presence of key signals received from the remote attendant consoles. When a key signal is received by the data unit, a KSP scan point is saturated. The key scan program then generates a hopper entry containing the key signal. After the key signals have been read, this same program sends any lamp data that has been awaiting transmission back to the console location. The centrex key scan program is entered from the executive control program on an interrupt basis.

3.14 Several scan points are provided to inform the system about the state of the data link circuit—that is, whether or not the data link circuit is in the process of transmitting or receiving data and/or whether or not there is any information present in its register waiting to be read by the CC. These scan points must be checked before lamp data is loaded into the register for transmission to the remote end of the data loop.

3.15 The centrex key scan function can be performed either by a CC or by an SP program (whichever is used for input-output functions).

4. THEORY — INTRODUCTION

4.01 The purpose of the centrex data link circuit is to:

- (a) Accept and record 24 bits from either of the two peripheral buses
- (b) Provide the means for converting this parallel word into a sequence of mark and space signals transmitted to the line in serial form
- (c) Generate and construct the proper line signal intelligence in accordance with a predetermined frequency—shift method of signaling
- (d) Provide means for simultaneously transmitting and receiving data at a rate of 1400 BPS and recording the received information in the same location that previously contained the transmitted word
- (e) Provide the means for initiating transmission placed as a request by either the ESS or remotely located data receiving circuitry
- (f) Provide means for detecting the absence of signals on the incoming line
- (g) Provide means, for diagnostic purposes, to advance the shift register and counter in single steps.

4.02 The centrex data link sub-unit blocks shown in Fig. 6 indicate both common circuitry and circuitry needed for each data link which is mounted in the same bay. The common circuitry provides facilities for reading peripheral bus information and includes pulse stretching or dynamic

buffer register circuitry. This circuitry will serve as a temporary memory for all bits received over the peripheral bus circuit. The circuit is duplicated in that each peripheral bus is connected to two identical halves containing receivers and register circuits. The common circuitry also contains facilities for receiving and amplifying enable signals. Provisions are made for accepting two enable signals for each data link and an additional enable-start (ENST) signal.

5. THEORY — DATA LOOP LINE SIGNAL TRANSMISSION

5.01 When key signals or lamp data is to be transmitted via a data loop, it must be converted into audio-frequency signals and must be applied to the transmission facility. Basically, the method of generating and receiving the line signal is the same for both directions. The data to be transmitted is temporarily stored in the shift register at the transmitting end of the data loop prior to transmission. The contents of the shift register are then read out serially and are converted into audio frequencies for transmission to the opposite end of the data loop. A synchronous form of transmission is employed whereby the receiving circuitry operates in synchronism with the transmitting circuitry.

A. Line Signal Data Transmission

5.02 The data loop line signal is constructed by a discontinuous frequency-shift keying method (Fig. 7). The line signal is generated by switching between two oscillators, one operating at 700 Hz and the other operating at 2100 Hz.

5.03 Tone Gate: Switching between the two oscillators is accomplished by the use of a tone gate. The tone gate applies the output of either of the two oscillators to the line, depending on the contents of the shift register. When the first bit in the shift register is a 1 (mark), the tone gate applies the output of the 2100-Hz oscillator to the line. When the first bit is a 0 (space), the tone gate applies the output of the 700-Hz oscillator to the line. Each of the succeeding bits causes the output of either the 700-Hz or 2100-Hz oscillator to be applied to the line in a similar manner.

5.04 Oscillator Buffer Circuit: The oscillator buffer circuit isolates the oscillator from the tone gate.

SECTION 231-037-000**5.05 Zero-Crossing Synchronizing Generator:**

This circuit is used to ensure that the shifting of the register is synchronized with the phase of the audio signal oscillators. Each zero crossing of the 700-Hz signal occurs at the same time and has the same polarity slope as the 2100-Hz signal. This is accomplished by stopping both oscillators momentarily and restarting them again in proper phase relation. This phase-correcting function is performed by the zero-crossing synchronizing generator. Figure 8 illustrates the output of the two oscillators and the points at which they are stopped and restarted in phase.

5.06 Oscillator: The basic source of the line signal is a pair of oscillators which are fundamentally identical. Mutual coupling insures that a reasonable degree of frequency tracking exists. Signal amplification and synchronizing pulses are generated by circuit packs SYNC-0 and OBC-0. These two circuit packs provide for the necessary signal gain as well as timing and synchronizing pulses.

5.07 Figure 9 illustrates a dc binary signal applied to a tone gate and the resulting line signal which is transmitted. (Only a few of the bits are shown in this illustration.) A binary 0, or space signal, is represented by a half cycle of the 700-Hz signal. A binary 1, or mark signal, is represented by three half cycles of the 2100-Hz signal. The presence of a mark will, therefore, cause a phase reversal during the center of a bit interval as opposed to the presence of a space.

5.08 When key data or lamp data is not being transmitted, the data loop idles with a steady 700-Hz tone applied to the line. This tone is equivalent to a continuous stream of spaces. The steady idling tone keeps the receiver circuit at the receiving end of a data loop in synchronism with the transmitter. This continuous idling tone also serves as a guard against impulse noise on the line causing false starts of the shift registers at the receiving end of the data loop.

B. Line Signal Data Recovery

5.09 Data recovery from the line signal is accomplished by sampling the received signal at the center of each bit interval. A phase reversal during the center of a bit interval caused by the presence of the 2100-Hz signal is interpreted by the receiving equipment as a mark.

5.10 The data receivers (Fig. 4) at both ends of the data loop are in either an idle or an active mode similar to the transmitters. The receivers must be switched to the active state prior to the reception of the data. The data receiver circuit at the central office end of the data loop is switched from an idle to an active mode as the associated transmitter changes from idle to active. The data receiver at the remote end is switched from an idle to an active mode by the receipt of the initial mark.

5.11 After switching to an active mode, the shift registers shift in synchronization with the transmit signal. This is because the last cell of the shift register is the bit being transmitted at any instant. The receivers interpret each bit slot as data and temporarily store the received data in an MS flip-flop, from which it is gated into the shift register in proper phase relationship to the shift pulses.

5.12 The oscillators in each data receiver are kept in synchronism and in phase with the incoming line signal by line-to-oscillator signal coupling. This permits synchronizing pulses and sampling pulses to be generated at the receiver. The synchronizing pulses are used to accurately adjust the phase of the receive oscillators. At the remote end these pulses also provide the shift function. These closely locked oscillator pairs also generate the sampling pulses used in sampling the center of each bit interval.

5.13 The central office end of a centrex data loop is equipped with one pair of oscillators for transmission and another pair for data recovery, whereas the remote end of a data loop is equipped with only one set of oscillators which performs both transmitting and receiving functions.

5.14 Figure 10 is a block diagram of a simplified data receiver. The tone gate which ensures that data is transmitted in synchronism with the received data is included.

5.15 The line amplifier in the data receiver amplifies the received line signal and provides the coupling to synchronize the 700-Hz oscillator signal with the line signal.

5.16 The oscillator buffer circuit amplifies the two local oscillator signals and furnishes the sampling pulses for the line signal sampler.

Review of "The al-Qa'ida Papers – Drones"

Overview

Recently, *The Associated Press* found several documents in buildings occupied by alleged *al-Qa'ida* fighters in Timbuktu, Mali. These papers have since been publically released on the AP's website in the original Arabic and a translation in English. One of the released documents was entitled "The al-Qa'ida Papers – Drones," and appears to give several different tips on how to avoid detection by overhead unmanned military drones. It was written by Abdullah bin Mohammed on June 17, 2011.

Below will be a copy of the original English translation text, along with some notes and comments on if these methods could actually be effective.

Tactics

1.) It is possible to know the intention and the mission of the drone by using the Russian-made "sky grabber" device to infiltrate the drone's waves and the frequencies. The device is available in the market for \$2,595 and the one who operates it should be a computer know-how.

SkyGrabber is an "offline" satellite downloader. It can intercept satellite traffic (video, movies, music, pictures, data, etc.) that is being sent by other satellite users/broadcasters and records the raw information to your hard drive. It does require compatible DVB satellite receiving hardware, a low-noise block converter, and a parabolic dish antenna. Metadata embedded within the raw MPEG video streams often provides important operational details, including the drone's GPS coordinates. Predators, and other military drones, often use commercial SATCOM satellites for the video/data feeds when operating in non-Line-of-Sight (LOS) modes. An external frequency transverter will need to be used to intercept any video/data on the drone's C-band LOS links. This is to convert the 5.2 – 5.9 GHz range down to the satellite receiver's IF (950 – 1750 MHz) range.

2.) Using devices that broadcast frequencies or pack of frequencies to disconnect the contacts and confuse the frequencies used to control the drone. The Mujahideen have had successful experiments using the Russian-made Racal.

You'd need to jam the Ku-band receiver on either the drone itself (10.95 – 12.75 GHz) or the orbiting satellite (13.75 – 14.50 GHz). This is theoretically doable, but would require a fair amount of RF jamming power and a steerable parabolic dish – and you'd probably need to be above the operating drone! Racal is a British defense contractor who makes high-quality military radios.

3.) Spreading the reflective pieces of glass on a car or on the roof of the building.

No! This would actually make it *easier* for an orbiting drone to follow you, not to mention being a great reflector for the laser designator used for laser-guided bombs and Hellfire missiles.

4.) Placing a group of skilled snipers to hunt the drone, especially the reconnaissance ones because they fly low, about six kilometers or less.

Easier said than done... Shooting a drone that you can't see, can't hear, and is flying at over 15,000 feet while 5 miles out isn't something you can do without a lot of luck – and a fire control radar. Maybe when it's taking off or landing, but getting that close to a military base isn't easy.

5.) Jamming of and confusing of electronic communication using the ordinary water–lifting dynamo fitted with a 30–meter copper pole.

Not sure what this means, but it doesn't sound like it would work.

6.) Jamming of and confusing of electronic communication using old equipment and keeping them 24–hour running because of their strong frequencies and it is possible using simple ideas of deception of equipment to attract the electronic waves devices similar to that used by the Yugoslav army when they used the microwave (oven) in attracting and confusing the NATO missiles fitted with electromagnetic searching devices.

You'd need to use real RF noise jammers at the drone's Ku–band, C–band, L1 & L2 GPS, and IFF frequencies. BTW, your jamming gear will make nice targets for anti–radiation weapons and direction finding gear, so make sure it's set up to not give away your location.

I'm not sure if the NATO/microwave oven legend is true or not. A microwave oven's emissions *could* possibly look like a 2.45 GHz CW illumination radar to some anti–radiation missiles.

7.) Using general confusion methods and not to use permanent headquarters.

Could possibly work... No central location makes it theoretically harder to track you down – but it will also make it harder to operate and secure as you're always on the move and would need to plan everything out ahead of time.

8.) Discovering the presence of a drone through well–placed reconnaissance networks and to warn all the formations to halt any movement in the area.

Could possibly work... It's *really* difficult to spot orbiting drones via your "eyes and ears." Portable radar sites based on salvaged and hacked marine radars (S– and X–bands) and interferometer–type surveillance gear to "listen" for the drones propeller could possibly work.

Detecting the drone's active RF emissions may also be possible. The fairly high–power Ku–band SATCOM uplinks may be detectable on the ground via tropospheric scatter, depending on the weather conditions.

9.) To hide from being directly or indirectly spotted, especially at night.

No! When using thermal imaging devices, moving at night would actually make you stand out even more! To counter thermal imaging systems, it's best to move around during dawn or dusk, when the general background thermal contrasts are changing – or when it's raining. It would also be best to move during the daytime and within a large group of (similar) people.

10.) To hide under thick trees because they are the best cover against the planes.

Possible, but thermal imaging devices will still find you under cover. Remember that the drones can loiter over the same area for 12+ hours, and you'd have to move sooner or later.

11.) To stay in places unlit by the sun such as the shadows of the buildings or the trees.

Again, this won't to anything if thermal imaging devices are being used, and purposely moving around in the shadows would probably make you look even *more* suspicious to the drone operator.

12.) Maintain complete silence of all wireless contacts.

True. Any radio/optical/acoustic communication system can be intercepted and "direction found." But if do need to communicate, use fast frequency-hopping, or other type of spread spectrum system, operating at the microwave frequencies and with strong encryption to minimize interception. 60 GHz microwave links are also naturally attenuated by the atmosphere. Laser-based communication systems can be very secure for point-to-point operations, but are difficult to aim.

You can mask general VHF/UHF radio traffic by transmitting on a frequency which is close to the video/audio carrier of a high-power FM or TV broadcast station. This is to help hide (somewhat) your lower power transmission within the higher power transmission. This is an old trick which everyone knows, though...

13.) Disembark of vehicles and keep away from them especially when being chased or during combat.

Yeah, just before the vehicle explodes you should probably get out and run!

14.) To deceive the drone by entering places of multiple entrances and exits.

Drones can loiter in the same general area at an altitude of 5,000 to over 25,000 feet, and are able to watch the same target for may hours. You better have a proper escape planned ahead of time...

15.) Using underground shelters because the missiles fired by these planes are usually of the fragmented anti-personnel and not anti-buildings type.

True, but there are several different models of the AGM-114 Hellfire missile designed for all different kinds of targets. The 500 pound GBU-12 Paveways which Predators/Reapers can also carry can usually penetrate most underground or hardened shelters.

16.) To avoid gathering in open areas and in urgent cases, use building of multiple doors or exits.

True, it's probably best to use the general population (and their travels) for your own cover.

17.) Forming anti-spies groups to look for spies and agents.

True, keep an eye out for any person(s) with a last name containing Cohen, Rosen, Berg, Stein, Stern, Katz, Levy, Baum, Fried, Gold, Silver, Leib, Frank, Witz, etc.

18.) Formation of fake gatherings such as using dolls and statutes to be placed outside false ditches to mislead the enemy.

This is unlikely to fool modern electro-optical sensors, maybe only for a short period of time. It would be funny to see a blow-up doll with a hair dryer stuck in it...

19.) When discovering that a drone is after a car, leave the car immediately and everyone should go in different direction because the planes are unable to get after everyone.

True, but detecting the drone in the first place is where the real challenge is. Be sure to use a "GBPPR Battlefield Laser Warning Receiver" as covered in *GBPPR 'Zine*, Issue #109.

20.) Using natural barricades like forests and caves when there is an urgent need for training or gathering.

Should work, but finding the proper natural barriers quickly may be difficult and they may even be under surveillance *before* you reach them. Others will be looking for these natural barriers, too...

21.) In frequently targeted areas, use smoke as cover by burning tires.

Smoke screens can block most electro-optical sensors for a short period of time, but in reality, burning tires will just cause your eyes to sting and you won't be able to breathe! A proper smoke screen should be deployed upon detection of an enemy laser designator, though.

22.) As for the leaders or those sought after, they should not use communications equipment because the enemy usually keeps a voice tag through which they can identify the speaking person and then locate him.

True, almost all voice radio or telecommunication traffic is trivial to intercept and record for future processing. Text-to-speech systems could be used to mask any voice communication, if needed.



GBPPR 800 MHz Cellular Phone Jammer

Overview

This is a RF jammer designed for the U.S. 800 MHz cellular phone band (870–895 MHz). It works by generating an overpowering sweeping RF carrier on the cellular handset's receive frequency range.

An Exar XR2206 Multifunction Generator will be used as the triangle wave generator for providing the sweep portion of the jammer circuit. The sweep generator will control a Z-Communications V580MC04 Voltage Controlled Oscillator (VCO) to sweep between approximately 850–895 MHz at a rate of around 100 kHz.

The VCO is arguably the most important component in a cellular phone jamming system. It's a little four-terminal device (V_{cc} , RF Output, Voltage Tune, and Ground) which generates the required low-level RF output signal with a minimal amount of fuss. Unfortunately, VCOs covering the proper frequency range you need can be difficult to find. Companies such as [Mini-Circuits](#) and [Z-Communications](#) are very helpful to amateur electronics enthusiasts, and will sell their VCO models in single quantities directly or point you to a local distributor.

The VCO you choose should cover the frequency range of the cellular base station's *downlink* frequencies (tower transmit) you wish to jam. You always try to jam the receiver, so in this case, you'd jam the mobile station's (handset) receive frequencies – which are the cellular tower's transmit frequencies. These [frequencies](#) will vary around the world, but the overall concept will remain the same.

Two 5 kohm multiturn potentiometers are required to provide a proper DC offset for the VCO's voltage tune line. What this does is give the sweeping triangle wave a positive DC voltage offset to help "center" the sweeping triangle wave within the required jamming frequency range. The amplitude of the triangle wave corresponds directly to the frequency width of the jamming range. Here's an example using a generic VCO:

<u>Voltage Tune (+ Volts DC)</u>	<u>Frequency Output (MHz)</u>
0	790
1	810
2	830
3	850
4	870
5	890
6	910

In our above example, a particular VCO is capable of tuning between 790–910 MHz with a voltage tune from 0 to +6 VDC. This works out to about 20 MHz of tuning per volt. So, if a person wanted to "jam" the frequencies between 870–890 MHz, they would need a +1 volt peak-to-peak triangle wave with a DC offset of +4 volts. This would result in voltage signal sweeping between +4 and +5 VDC (referenced from ground), and would sweep the VCO's RF output between 870–890 MHz. Of course, in real life, the voltage-to-frequency mappings are not this precise.

Another important section of the RF jammer chain is the final RF power amplifier. This is a device which takes a small RF input signal, say at +10 dBm (10 milliwatts), and amplifies it up to around +36 dBm (4 watts) or more. The cheapest source of these amplifiers is from old analog cellular phones themselves. Some older cellular phones (Motorola, Nokia, Uniden, etc.) will use a broadband RF power "hybrid" module which helps make their construction easier and smaller.

These RF module devices tend to be very wideband frequency wise, and will easily amplify RF signals outside of their intended range. Increasing the module's RF power control bias (V_{apc}) or V_{dd} voltage can also milk a little more gain out of them, but will also negatively effect the lifetime of the power module. The RF power module *will* need to be connected to a large, smooth heatsink and may also require a cooling fan on higher power amplifiers.

For this project, we'll be using a Hitachi PF0030 820–850 MHz RF power amplifier module salvaged from an old CT–1055 Radio Shack/Nokia cellular phone. These particular modules will work to over 900 MHz with only a slight decrease in gain at those higher frequencies. Running the V_{dd} voltage at +15 to +17 VDC will also slightly increases the available RF power output. I've gotten them to hit 10+ watts output when properly layed out and constructed with a large heatsink, but it's usually not worth the risk. Try to keep the maximum RF output power around 4 to 6 watts.

Most broadband RF power hybrid modules rarely need more than +13 dBm (20 mW) of RF input to work properly. This is perfect for being driven directly from the VCO's RF output without the need for an additional RF pre–amplification stage. Increasing the RF input power will only shorten the lifetime of the power module and will have a minimal impact on output gain.

The most important part of any radio system is the antenna. Spend a good chunk of your money on the antenna system (and coaxial cable), and you'll have no problems. Use a coathanger and some alligator clips and you'll be emailing me 50 times a day saying it doesn't work.

Thankfully, you can also salvage a usable antenna from (some) old analog cellular phones. Those magnetic or trunk mount antennas work the best. Glass–mount antennas or anything "stick–on" are basically crap. Directional gain (Yagi) antennas can be used to increase the jammer's performance, but only in the direction the antenna is pointed. High–gain, omni–directional antennas are ideal for most RF jamming applications. For homebrew designs, you can scale down (or up) 900 MHz band amateur radio band antennas.

Below is the voltage–to–frequency mapping of Z–Comm V580MC04 VCO. The RF output power was around +8 dBm over the entire frequency range.

<u>Voltage Tune (+ Volts DC)</u>	<u>Frequency Output (MHz)</u>
0.00	771
0.15	825 800 MHz Cell Phone Handset TX / SMR Repeater Input
0.25	832 800 MHz Cell Phone Handset TX
0.50	847 800 MHz Cell Phone Handset TX
0.75	861 800 MHz Nextel / SMR Repeater Output
1.00	874 800 MHz Cell Phone Handset RX
1.25	885 800 MHz Cell Phone Handset RX
1.50	897 800 MHz Cell Phone Handset RX
1.75	907 Part 15 / Amateur Radio
2.00	918 Part 15 / Amateur Radio
2.25	928 Part 15 / Amateur Radio / Pagers / GSM
2.50	938 Pagers / 900 MHz Trunked Systems / GSM
2.75	948 900 MHz Trunked Systems / GSM
3.00	957 STL Links / GSM
3.25	967
3.50	976
3.75	986
4.00	995
4.25	1004
4.50	1014
4.75	1023
4.91	1030

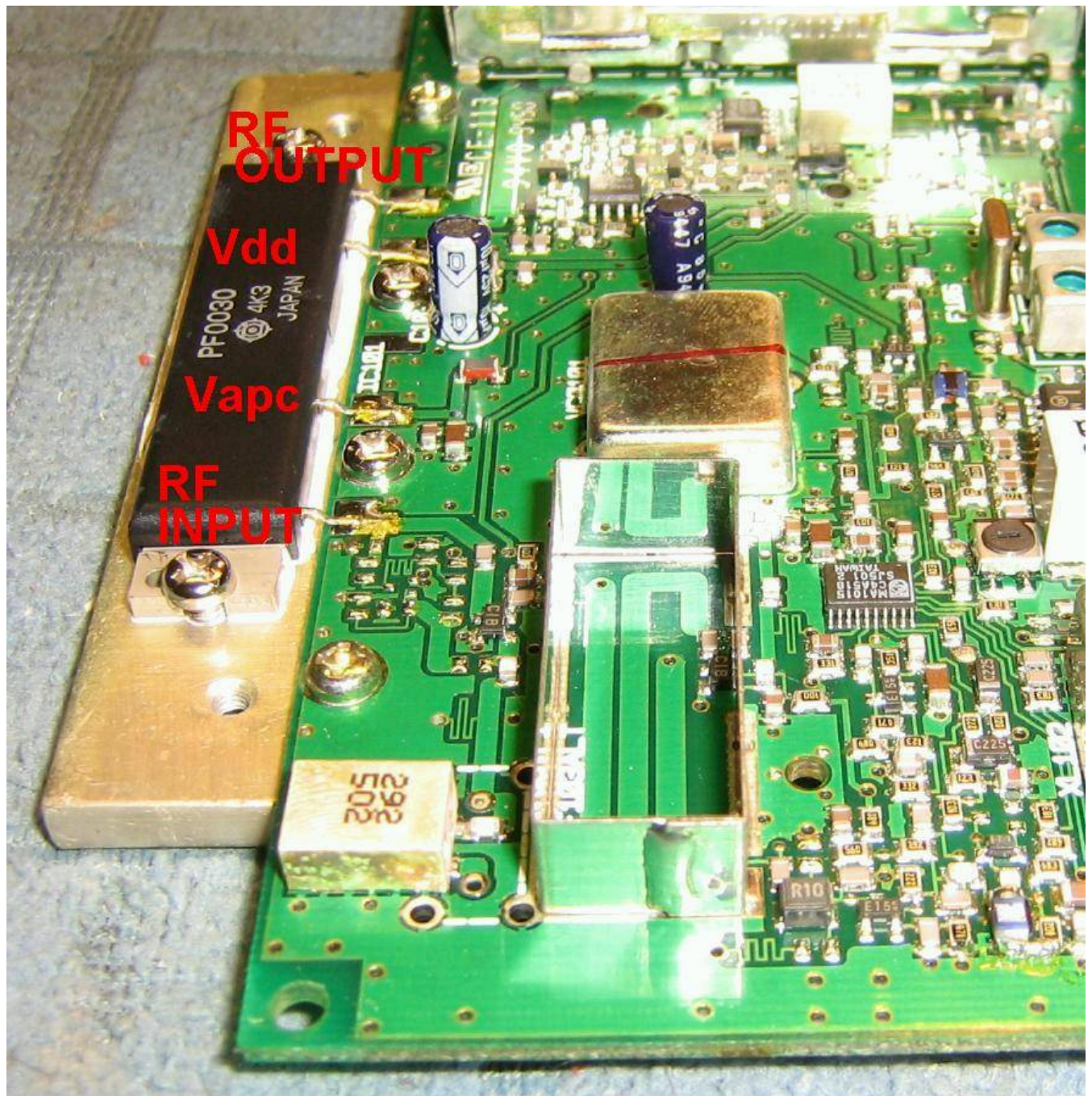
Pictures & Construction Notes



Overview of a old Radio Shack CT-1055 (Cat No. 17-1007A) 800 MHz band analog cellular phone.

The Hitachi PF0030 RF power amplifier module from this phone will be salvaged for use as the RF power amplifier in the jammer.

You can often find these cellular phones at hamradio swapfests or you can find the individual PF0030 modules on eBay for under \$10.

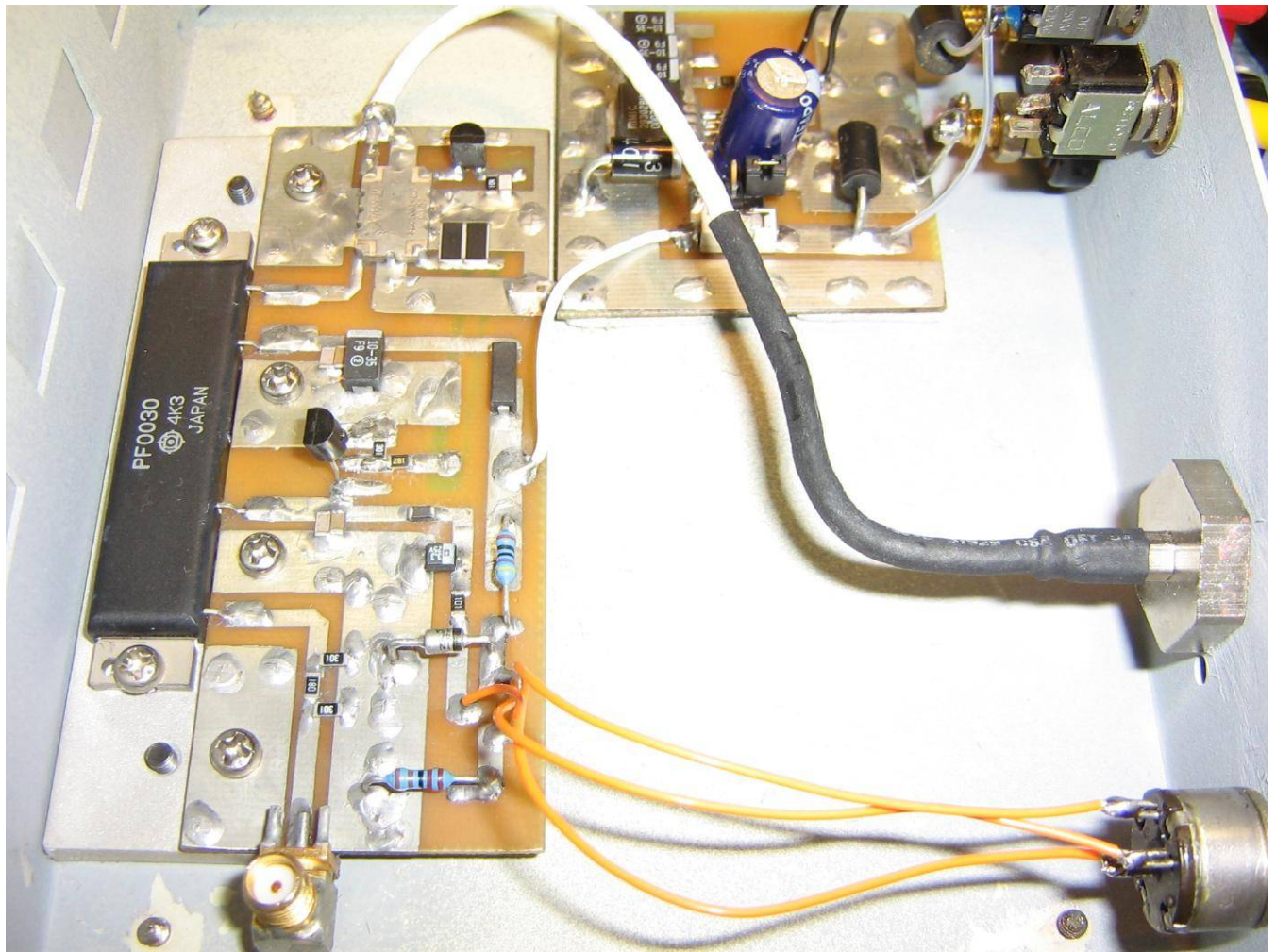


Closeup view of the Hitachi PF0030 RF power amplifier installed in the stock Radio Shack cellular phone.

Note how it is mounted on its own little aluminum heatsink block. This should also be salvaged and used in the jammer.

There should be a *very* thin smear of heatsink grease on the back flange of the PF0030. The PF0030 should then be attached to the heatsink via two screws. Be sure not to overtighten the screws or the PF0030's flange will flex, cracking the delicate internal circuit board.

The PF0030's flange should share a common ground with the rest of the system.



Installing the PF0030 RF power module in the case for the cellular phone jammer.

The +10 VDC voltage regulator board is mounted just behind the input banana jacks.

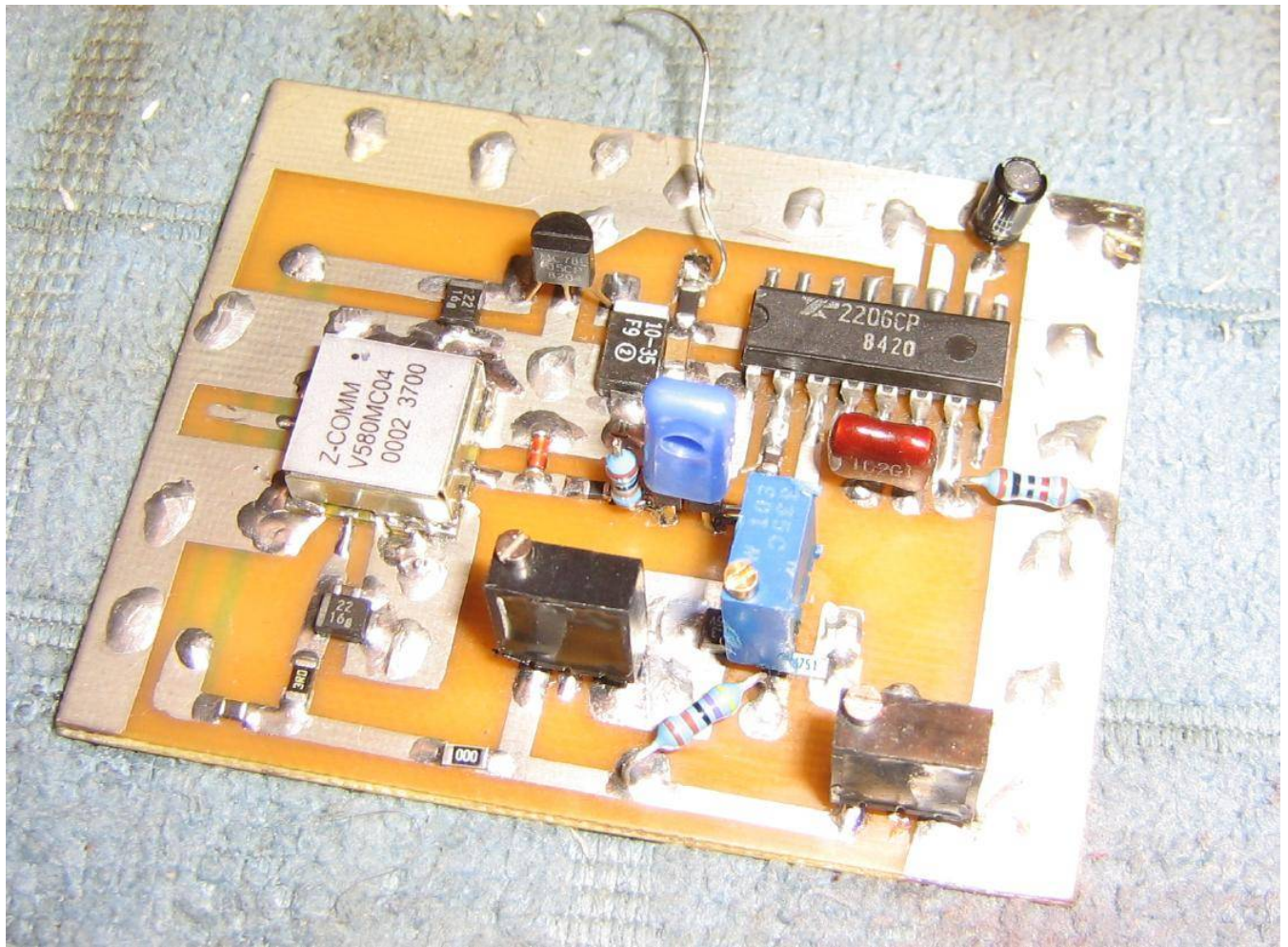
The regulator board is a little overengineered, but the extra filtering and protection is required if you are using the +12 VDC power from a vehicle. Those tend to be electrically noisy.

The circuit for the PF0030 is taken basically from the datasheet. An optional SWR protection circuit was added using an Anaren directional coupler to monitor the reflected power. In a high SWR condition, the voltage to the PF0030's V_{apc} line is shunted to ground, effectively lowering the RF output of the PF0030.

The ferrite bead on the PF0030's V_{dd} line should be capable of handling 3 amps continuous.

Proper RF engineering PC board layout and construction techniques should be used on the circuit board for the RF amplifier and VCO.

The PF0030's V_{dd} line can be connected to +10 VDC if you don't require the full RF output or if you need reduce the overall current draw.



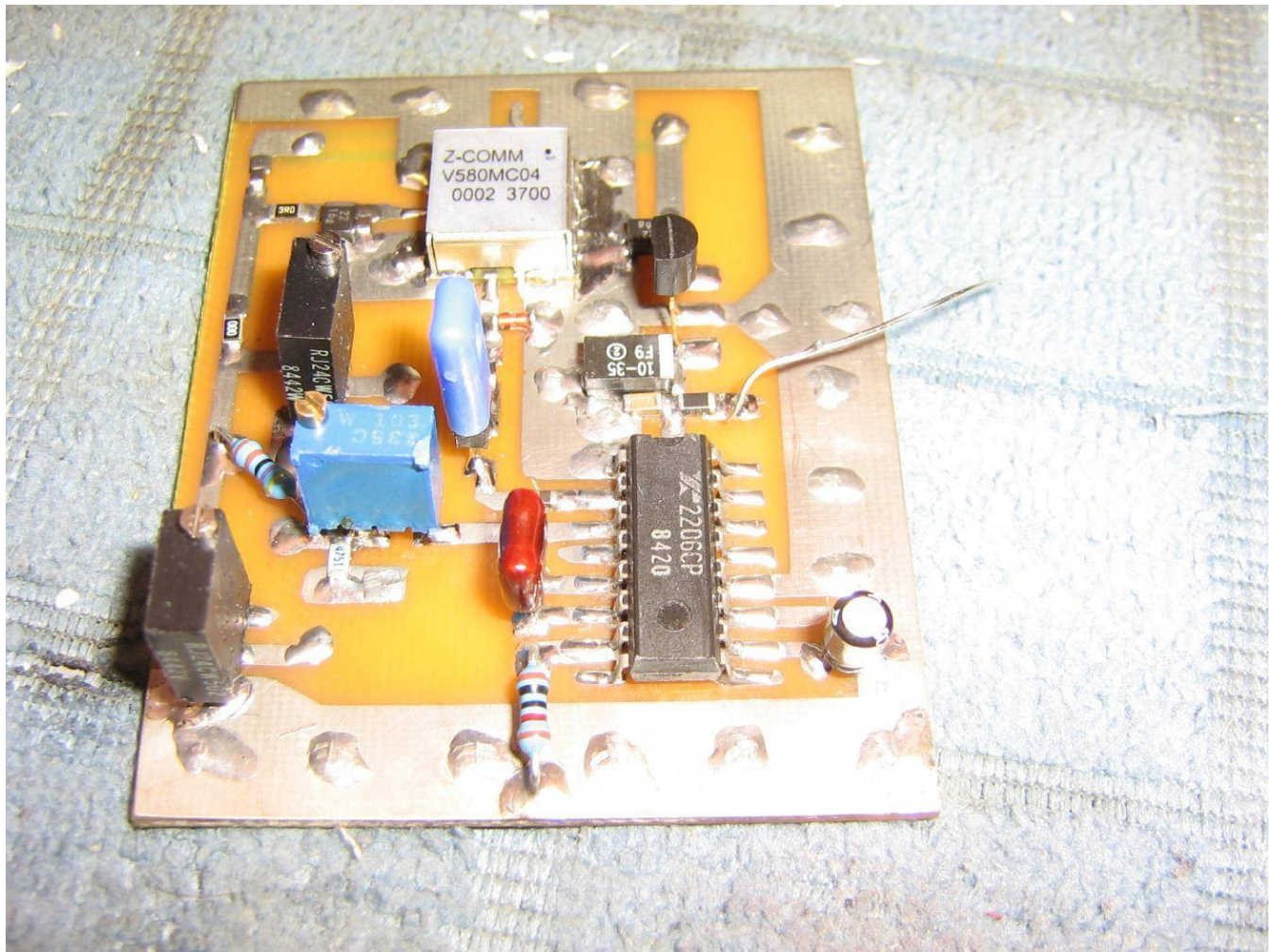
Overview of the sweep generator and VCO circuit board.

The Exar XR2206 is configured to produce a triangle wave at around 100 kHz.

The blue multiturn potentiometer controls the **Sweep Amplitude** of the triangle wave. This amplitude corresponds to the jammer's frequency sweep (start/stop) range.

The two black multiturn potentiometers control the **Band A** and **Band B** DC offsets on the VCO for determining the "start" frequency of the jammer.

The Z-Comm V580MC04 VCO is the silver box on the left. It has its own 78L05 voltage regulator.



Alternate view of the sweep generator and VCO circuit board.

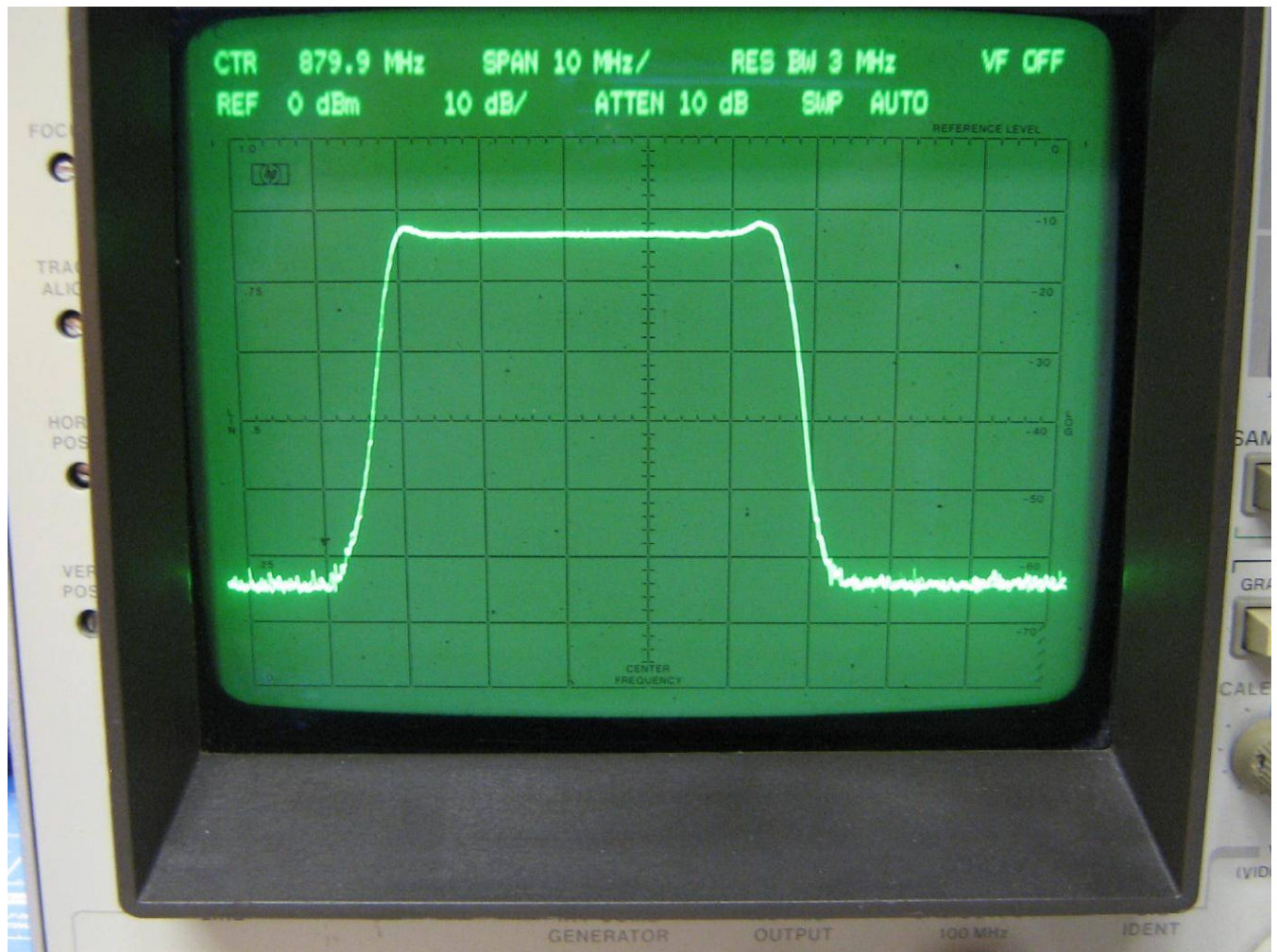
The timing resistor and capacitor for the XR2206 should be of high quality and tolerance. A 1% tolerance 10k resistor and 5% tolerance 1000 pF capacitor are shown here.

The peak-to-peak voltage of the triangle wave should be around 0.894 volts.

The DC offset for **Band A** (850 – 895 MHz) should be 1.02 volts. Measured at the wiper terminal of the **Band A** multiturn potentiometer.

The DC offset for **Band B** (810 – 865 MHz) should be 0.396 volts. Measured at the wiper terminal of the **Band B** multiturn potentiometer.

These voltages were for my own jammer. Yours may need to be tweaked a little bit because of component tolerances. I increased the jamming frequency range on **Band A** a bit to cover the 800 MHz Specialized Mobile Radio (SMR), Nextel, and public safety frequencies.



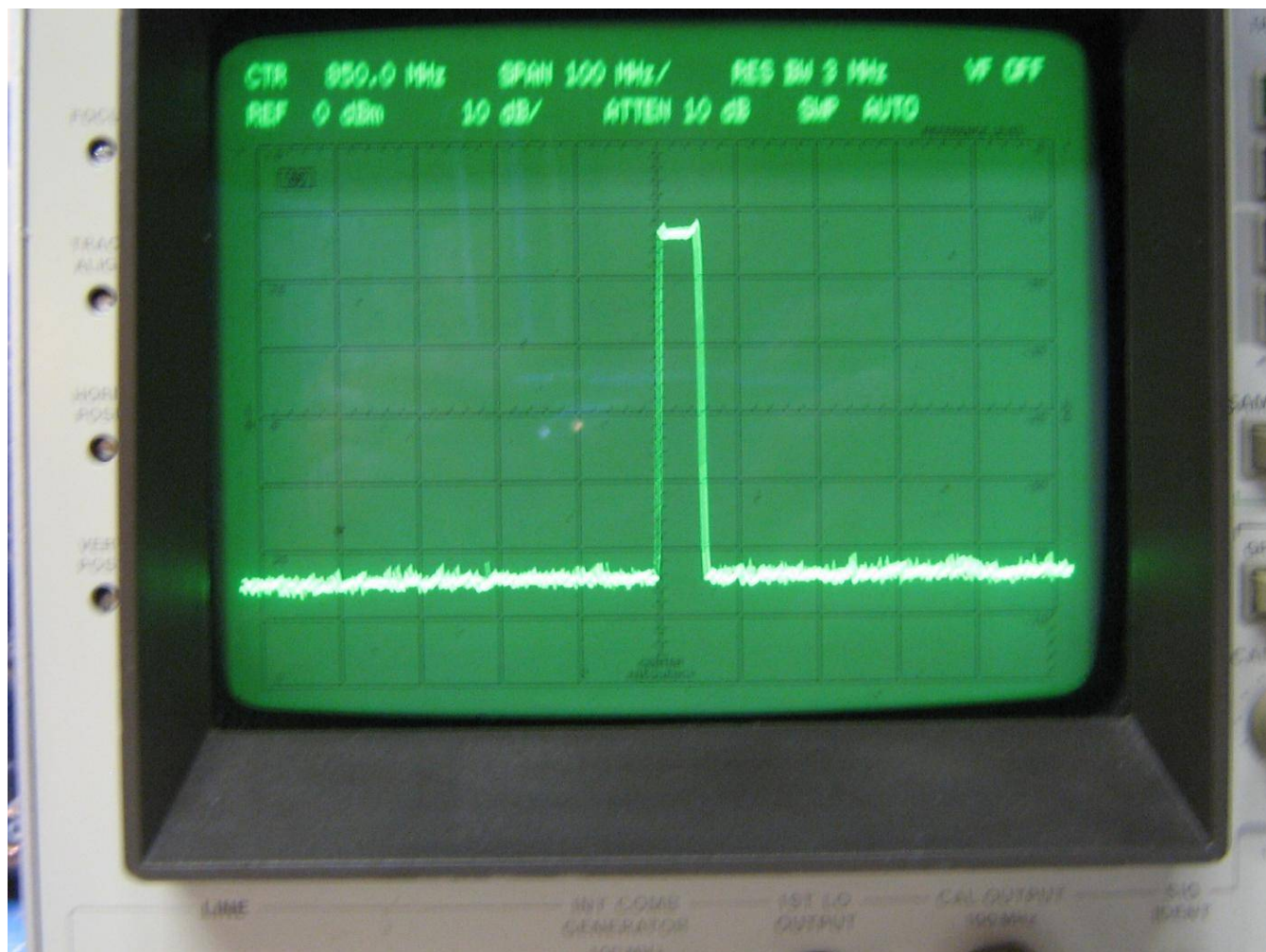
HP8569B spectrum analyzer view of the GBPPR 800 MHz Cellular Phone Jammer in operation with **Band A** selected.

The display is 10 MHz per horizontal division and 10 dB per vertical division.

The center frequency is 880 MHz.

The jamming frequency range is approximately 850 MHz to 895 MHz.

Because the jamming power is spread over such a large bandwidth – 45 MHz in this case – the jammer's effective range won't be as great as if were all centered on a single frequency. This is normal and should be taken into account in tactical jamming applications.

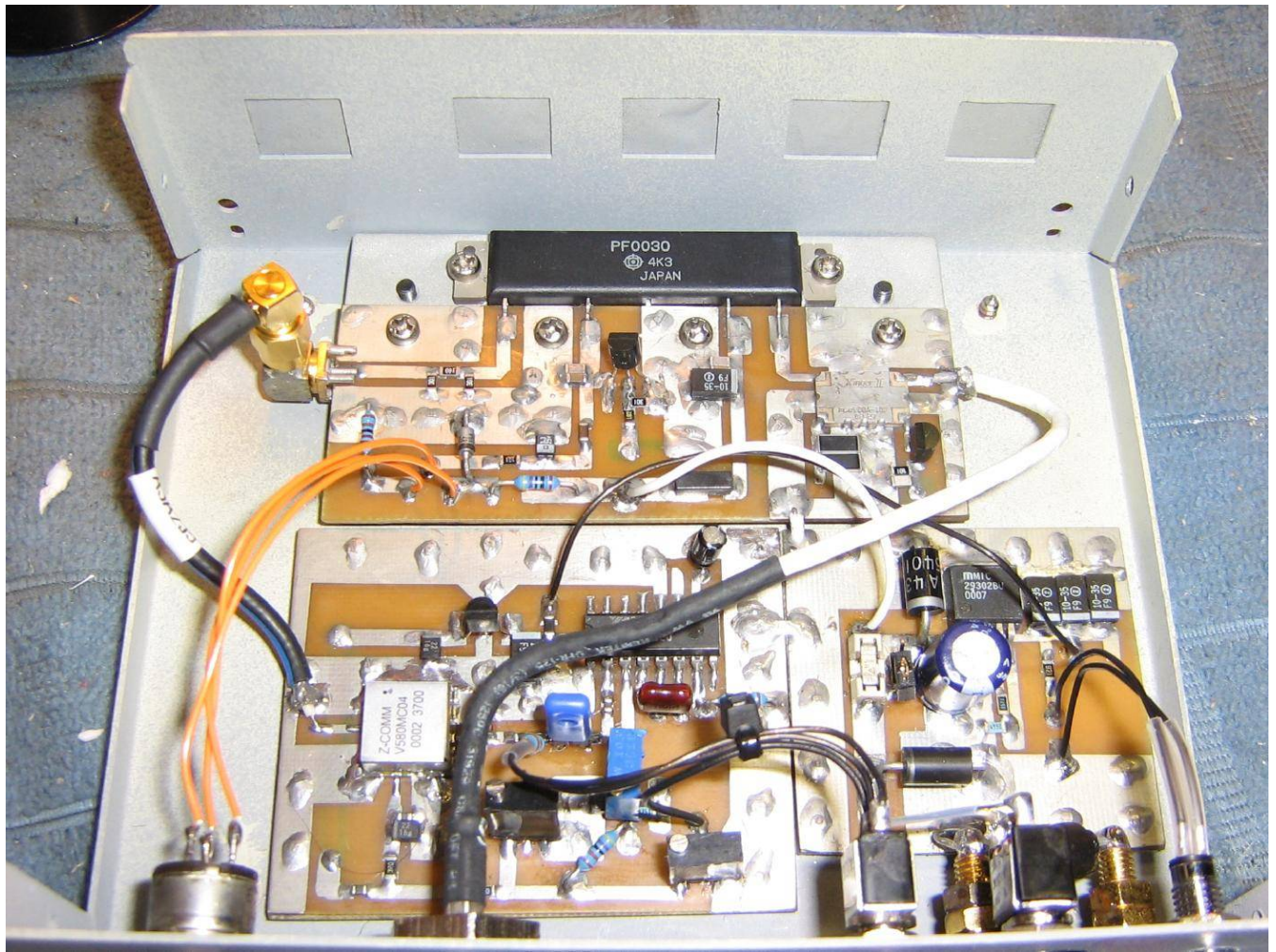


Another HP8569B spectrum analyzer view of the GBPPR 800 MHz Cellular Phone Jammer in operation with **Band A** selected.

The display is 100 MHz per horizontal division and 10 dB per vertical division.

The center frequency is 850 MHz.

Displayed range is 400 MHz to 1300 MHz. There were major spurs or oscillations detected in the completed jammer.



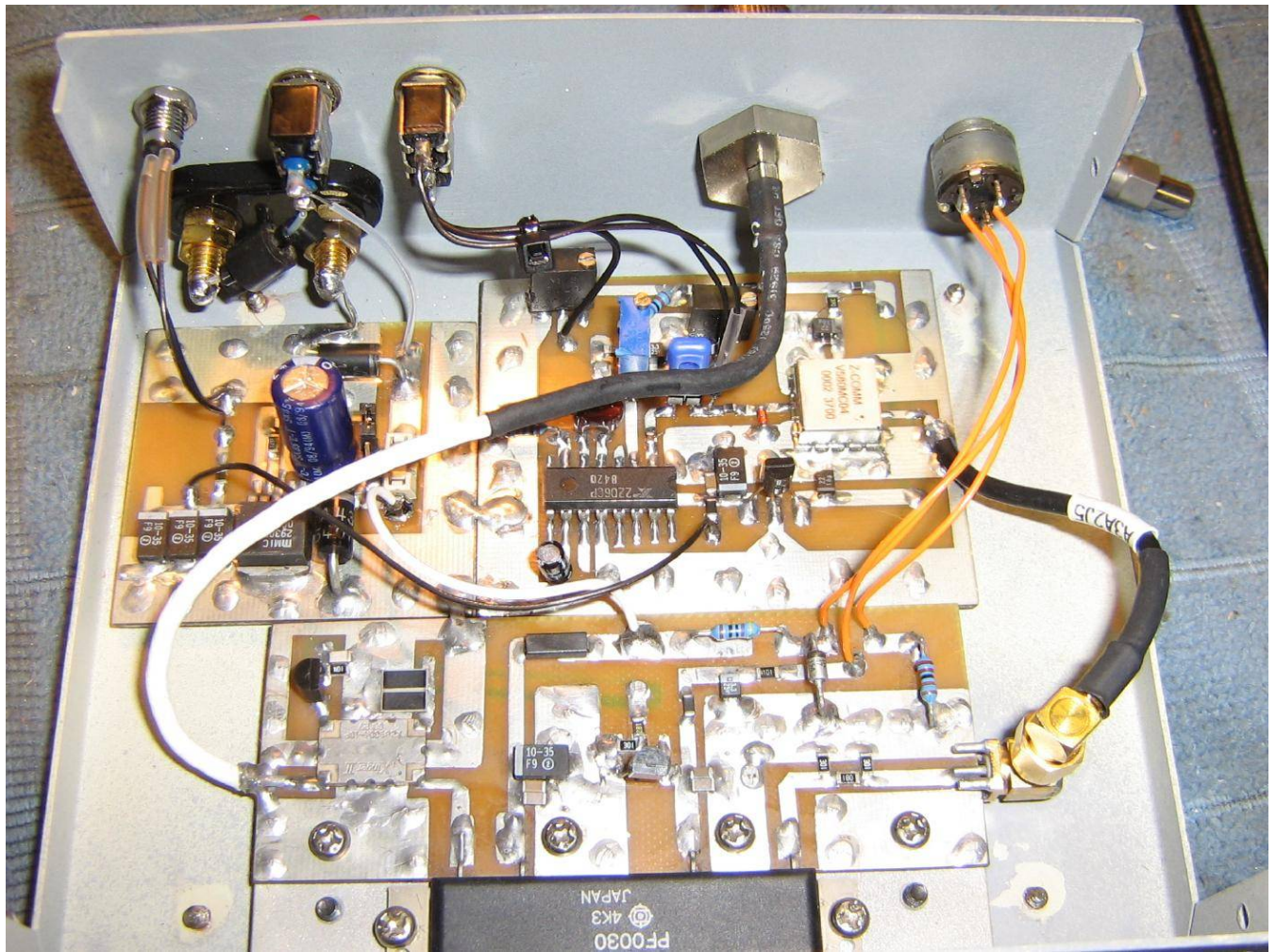
Internal overview of a completed GBPPR 800 MHz Cellular Phone Jammer.

The **RF Power Control** potentiometer is on the lower-left, connected via the orange wires.

The RF output from the VCO is connected to the PF0030 RF power module circuit board using a short SMA jumper.

A panel-mounted TNC connector is used for the final **RF Output / Antenna** connection.

Ideally, the RF output jack and the VCO shouldn't be so physically close together.



Alternate view.

The Anaren directional coupler is on the RF output of the PF0030 for an optional SWR protection circuit.

The 50 ohm termination resistor for the directional coupler should be 1 watt and of RF quality (i.e. surface mount). I didn't have any of those available, so I used two 100 ohm / 1 watt SMT resistors in parallel.



Overview of the finished GBPPR 800 MHz Cellular Phone Jammer.

An example antenna is also shown.

The **RF Power Control** potentiometer is on the left. Fully counter-clockwise is minimum (or no) RF output, and rotating the control clockwise gradually increases the RF output.

The **RF Output / Antenna** panel-mount TNC connector is in the middle.

The +12 VDC power input is via the banana jacks on the right.

The red switch is for main DC power.

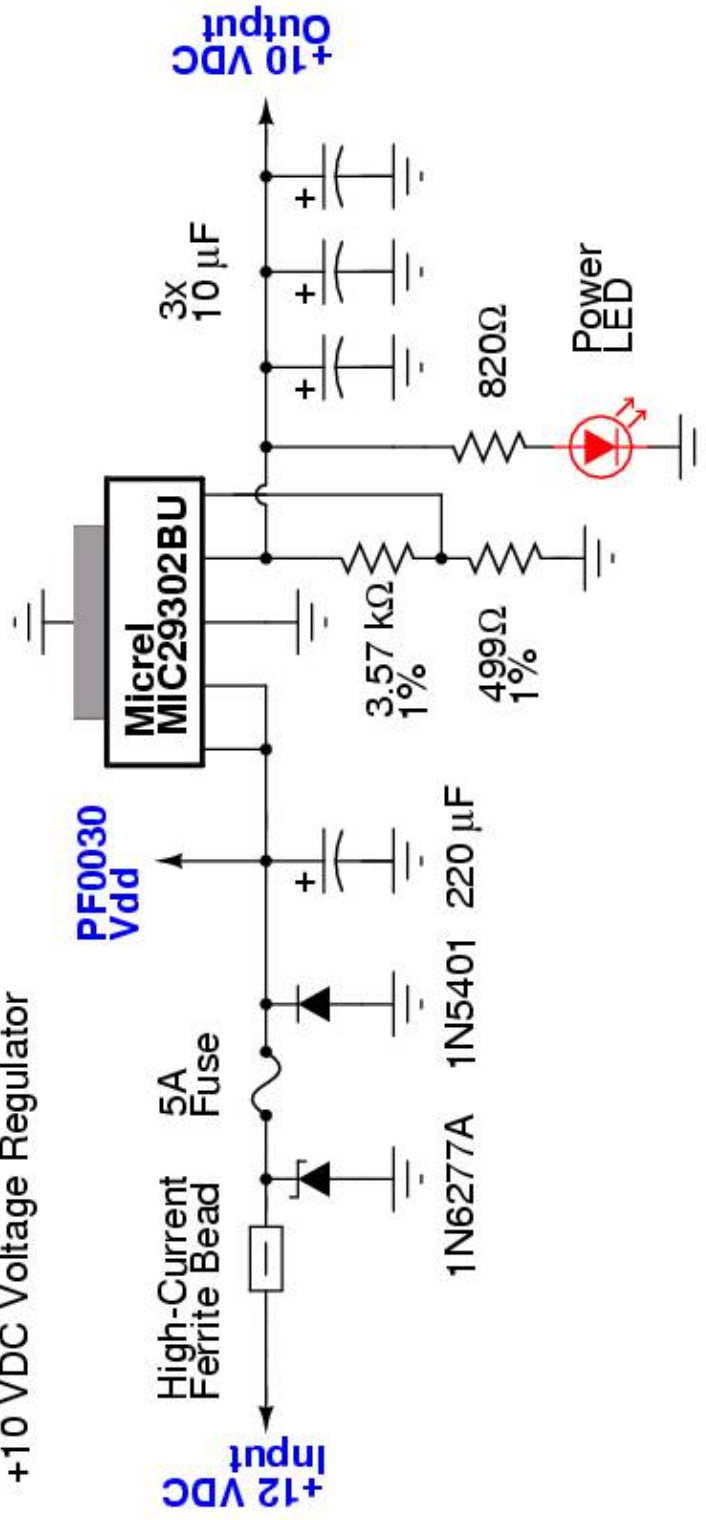
The yellow switch is for **Band Select**.

The RF power output at +12 VDC is:

<u>Current Draw</u>	<u>RF Output (dBm)</u>	<u>RF Output (Watts)</u>
0.5 A	+31.7	1.48
1.0 A	+36.8	4.79
1.5 A	+38.5	7.08
2.0 A	+39.0	7.94

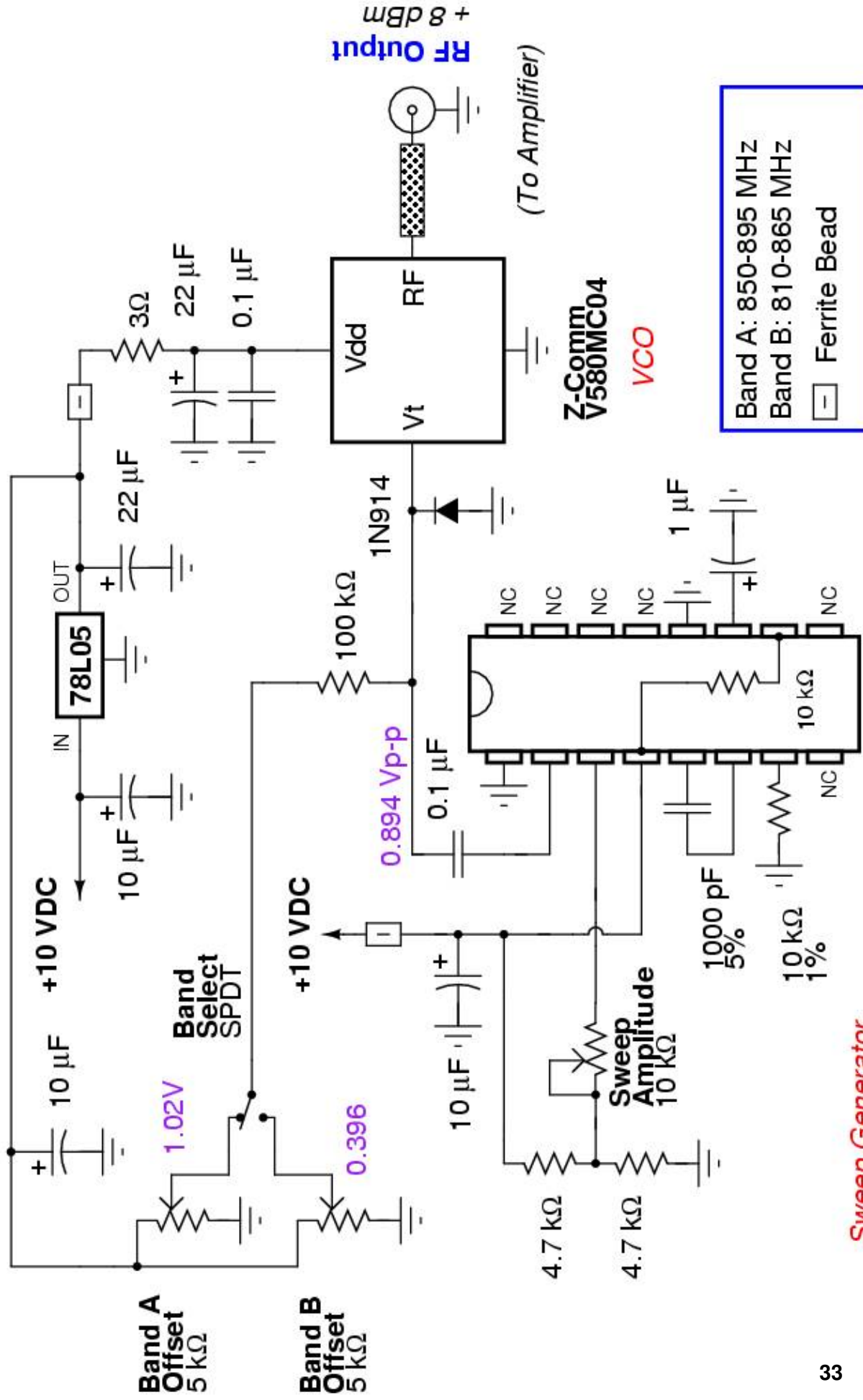
GBPPR 800 MHz Cellular Phone Jammer

+10 VDC Voltage Regulator



GBPPR 800 MHz Cellular Phone Jammer

Sweep Generator & VCO

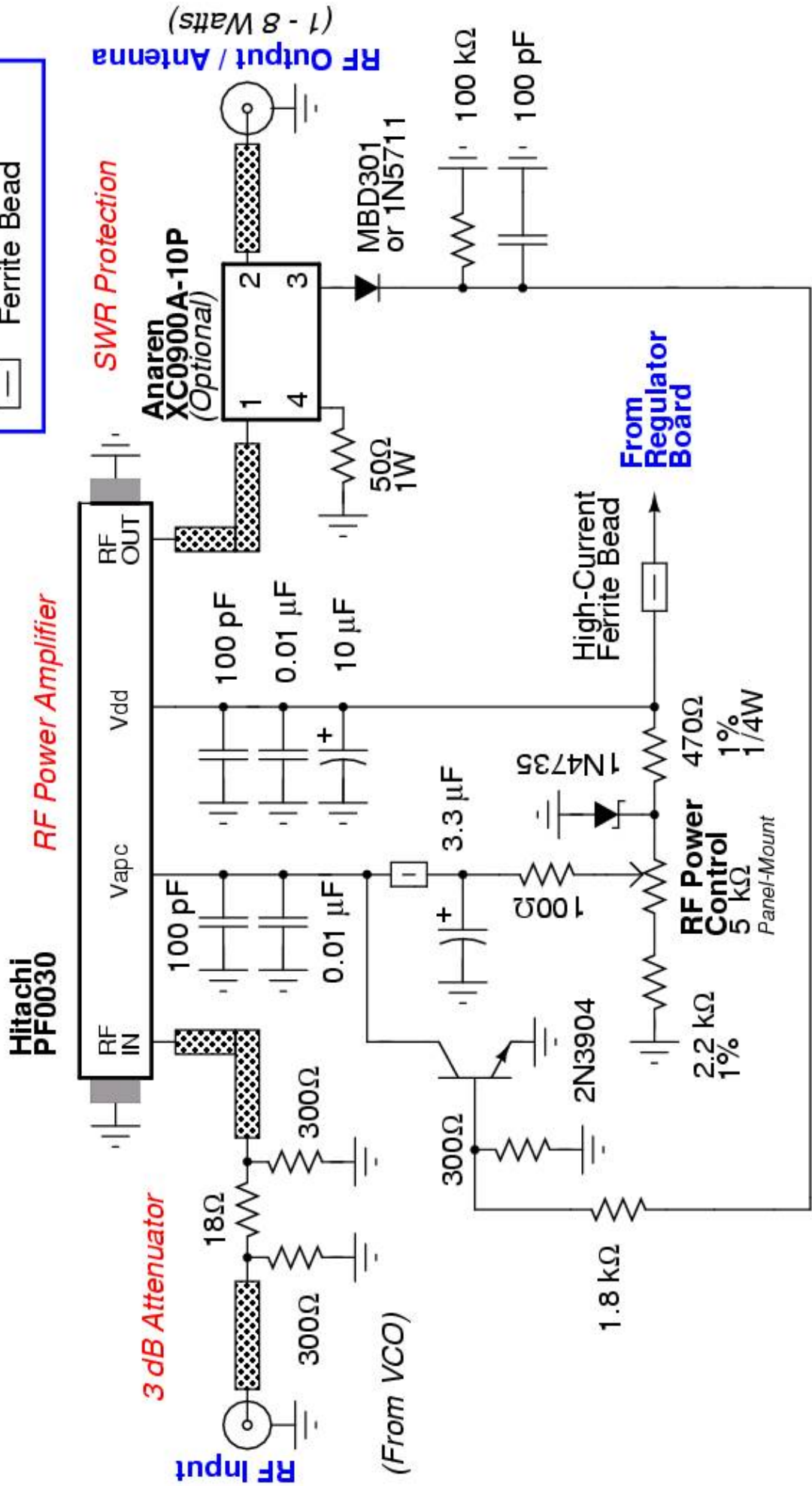


Sweep Generator

Exar XR2206

GBPPR 800 MHz Cellular Phone Jammer

RF Power Amplifier



Bonus



End of Issue #110



Any Questions?

Editorial and Rants

Remember when we could give speeches without 'pre-approval?' Where are all those so-called 'freedom of speech' advocates now? Change!

School Cut Off Valedictorian's Microphone During Speech

June 7, 2013 – From: myfoxdfw.com

by Brandon Todd

A North Texas high school silenced its Valedictorian's microphone during his speech, prompting questions over his free speech rights.

Students attending the Joshua High School graduation say Remington Reimer's microphone was cut off, right when he began to talk about the Constitution.

"He just said, he was talking about getting constitutional rights getting taken away from him," Colin Radford, a Joshua H.S. graduate, said. "And then he said, just yesterday they threatened to turn my microphone off, and then his microphone went off."

Reimer, who was accepted into the Naval Academy, had his speech pre-approved by the school district.

Joshua Independent School District issued a statement:

"Student speakers were told that if their speeches deviated from the prior-reviewed material, the microphone would be turned off, regardless of content. When one student's speech deviated from the prior-reviewed speech, the microphone was turned off, pursuant to District policy and procedure."

Many attendees initially asked if the microphone was turned off because Reimer mentioned religion. But since the ceremony opened and closed with a prayer, and Reimer's speech mentioned God and Jesus throughout, graduate Zachery Hull believes it had nothing to do with religion.

"Freedom of speech," Hull said. "He said what he was going to say, they did what they had to do. Everyone was right."

Reimer's mother told FOX 4 off camera that she, her family and her son had no comment.

I think it's important to understand that you can't have 100 percent security and then have 100 percent privacy and zero inconvenience.

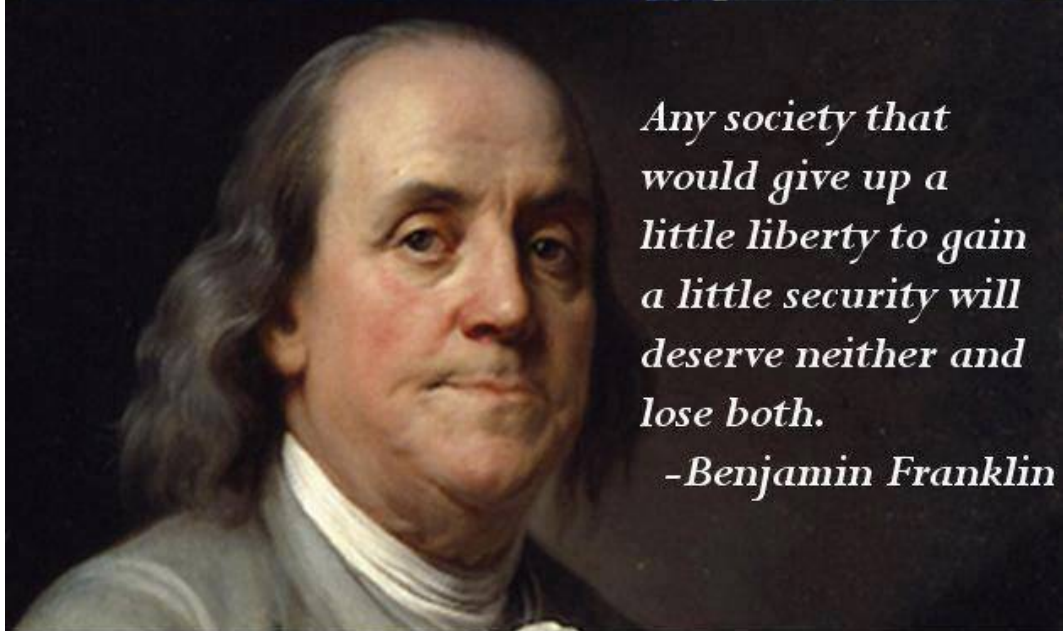
We're going to have to make some choices as a society.

-Barack Obama



Any society that would give up a little liberty to gain a little security will deserve neither and lose both.

-Benjamin Franklin



OBAMA: ALL YOUR INTERNETS ARE BELONG TO US.

A 3% tax on tea eventually led to the American revolution. Now you pay up to 70% of your earnings to a De Facto corporate government. You are groped at the airport, surveilled on the street, spied upon in your own home, fed propaganda by the media, lied to by your representatives, have your rights eroded, your currency devalued and are on the verge of an overt police state. WTF happened to home of the brave, land of the free?



"It is getting to the point where the mark of international distinction and service to humanity is no longer the Nobel Peace Prize, but an espionage indictment from the U.S. Department of Justice."

---- June 22, 2013 quote from Julian Assange.

(wikileaks.org/Statement-by-Julian-Assange-after,249.html)

How the Media Lies to You

The Fake

Greek mass media outlets such as *Alpha TV* and the *Editor's Newspaper* used this badly photoshopped picture as supposed "proof" for their false allegations that members of the Greek nationalist party Golden Dawn violently invaded the Panarcadian Hospital in Tripoli.



What actually happened

Representatives of Golden Dawn visit the Panarcadian Hospital and have a civilized discussion with the hospital's manager, Helen Siourouni (left), in which she agrees that the employment of illegal immigrants within the hospital is a big problem and unfair to the Greek taxpayer. She was later removed from her position as manager, because she allegedly "allowed armed thugs to walk around the hospital".



The Real Photo

Golden Dawn members protecting a peaceful demonstration from violent anarchists, who in Greece are notorious for killing civilians by bombing places such as shopping malls and subway cars.

Photo taken on Crete, more than 400km southeast of the hospital in question.

